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26703 7590 07/24/2009

HARNESS, DICKEY & PIERCE P.L.C.
5445 CORPORATE DRIVE
SUITE 200
TROY, MI 48098

EXAMINER

BLAIR, DOUGLAS B

ART UNIT

PAPER NUMBER

2442

DATE MAILED: 07/24/2009

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/991,043

11/21/2001

William Lo

MP0086

8184

TITLE OF INVENTION: APPARATUS AND METHOD FOR AUTOMATIC SPEED DOWNSHIFT FOR A TWO PAIR CABLE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$0	\$0	\$1510	10/26/2009

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

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B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

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(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/991,043 11/21/2001 William Lo MP0086 8184

TITLE OF INVENTION: APPARATUS AND METHOD FOR AUTOMATIC SPEED DOWNSHIFT FOR A TWO PAIR CABLE

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nonprovisional NO \$1510 \$0 \$0 \$1510 10/26/2009

EXAMINER	ART UNIT	CLASS-SUBCLASS
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BLAIR, DOUGLAS B 2442 709-250000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____
- (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____
- 3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY AND STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
- ☐ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies _____

4b. Payment of Fee(s); (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

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Date _____

Typed or printed name _____

Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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EXAMINER

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ART UNIT

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Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 1377 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 1377 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Notice of Allowability	Application No.	Applicant(s)	
	09/991,043	LO, WILLIAM	
	Examiner	Art Unit	
	DOUGLAS B. BLAIR	2442	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the Appeal Brief filed on 2/9/2009.
2. ☒ The allowed claim(s) is/are 1-131 and 156-182.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
 - * Certified copies not received: ____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date ____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date ____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|---|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date ____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date ____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other ____. |

/Douglas B Blair/
Primary Examiner, Art Unit 2442

Art Unit: 2442

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Damian Aquino (Reg. No. 54,964) on 7/14/2009.

The claims are to be amended as shown on the following page:

Listing of the Claims:

1. (Original) A physical layer of a first device that is connected to cable of an Ethernet network, comprising:

a digital signal processor (DSP) coupled to said cable that receives and decodes first signals on said cable and that codes and transmits second signals on said cable; and

an autonegotiation controller that communicates with said DSP and that includes a cable detector that determines a first number of pairs of twisted pair wires of said cable that are operable.

2. (Original) The physical layer of claim 1 wherein said cable includes at least one of two pairs of twisted pair wires and four pairs of twisted pair wires

3. (Original) The physical layer of claim 1 wherein said autonegotiation controller includes a speed adjuster that masks an advertised speed of said first device when said cable detector determines that said first number is less than the number of twisted pair wires required to support a requested speed of said first device.

4. (Original) The physical layer of claim 3 wherein said requested speed is 1 Gigabit per second and said first number is two.

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5. (Original) The physical layer of claim 3 wherein said speed adjuster does not mask said advertised speed of said first device when said first number is greater than or equal to the number of twisted pair wires that are required to support said requested speed.

6. (Original) The physical layer of claim 3 wherein said speed adjuster does not mask said advertised speed of said first device when said requested speed is less than 1 gigabit per second.

7. (Original) The physical layer of claim 1 wherein a pair of twisted pair wires are inoperable if signals are not received on said pair.

8. (Original) The physical layer of claim 1 wherein a pair of twisted pair wires are inoperable if signals received by said pair cannot be decoded correctly by said DSP.

9. (Original) The physical layer of claim 3 wherein said speed adjuster increments a first counter when said cable detector determines that said first number is equal to two and autonegotiation fails.

10. (Original) The physical layer of claim 9 wherein said speed adjuster resets and sets said first counter equal to zero when said first counter is equal to a first limit.

11. (Original) The physical layer of claim 1 wherein said cable detector includes a maxwait timer and has a first state.

12. (Original) The physical layer of claim 11 wherein said cable detector transitions from said first state to a second state when said DSP receives signals on at least one of a first pair and a second pair of twisted pair wires.

13. (Original) The physical layer of claim 12 wherein said cable detector transitions from said second state to a third state when said DSP receives and decodes signals on said first and second pairs of twisted pair wires.

14. (Previously Presented) The physical layer of claim 13 wherein said cable detector transitions from said second state to a fourth state when said DSP receives signals on at least one of said first and second pairs but not on a third pair and a fourth pair of twisted pair wires and said maxwait timer times out.

15. (Original) The physical layer of claim 14 wherein said cable detector transitions from said third state to said fourth state when said DSP receives and decodes signals on said first and second pairs but does not receive signals on said third and fourth pairs and said maxwait timer times out.

16. (Original) The physical layer of claim 15 wherein said cable detector includes a slave counter that is incremented each time said cable detector transitions to said fourth state.

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17. (Original) The physical layer of claim 16 wherein said cable detector returns to said first state when said slave counter is less than slimit and said cable detector sets said first number equal to two when said slave counter equals slimit.

18. (Original) The physical layer of claim 17 wherein said cable detector transitions from said first state to a fifth state when said maxwait timer times out and said DSP fails to detect signals on said first pair and said second pair.

19. (Original) The physical layer of claim 18 wherein said cable detector includes a master counter that is incremented each time that said cable detector transitions to said fifth state.

20. (Original) The physical layer of claim 19 wherein said cable detector returns to said first state when said master counter is less than mlimit and said cable detector sets said first number equal to two when said master counter equals mlimit.

21. (Original) The physical layer of claim 20 wherein said cable detector sets said first number equal to four when said DSP receives and decodes signals on said first, second, third and fourth pairs.

22. (Original) The physical layer of claim 21 wherein said cable detector transitions from said second state to a sixth state when said maxwait timer times out, said DSP

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does not receive and decode signals on said first and second pairs of twisted pair wires, and said DSP does not receive signals on at least one of said first and second pairs but not said third and fourth pairs.

23. (Original) The physical layer of claim 22 wherein said cable detector transitions from said third state to a sixth state when said maxwait timer times out and said DSP does not receive and decode signals on said first, second, third and fourth pairs.

24. (Original) The physical layer of claim 23 further comprising a status indicator that notifies said first network device when said requested speed is being masked.

25. (Original) A physical layer of a first device that is connected to cable of an Ethernet network, comprising:

cable including at least two pairs of twisted pair wires;

a digital signal processor (DSP) coupled to said cable that receives and decodes first signals on said cable and that codes and transmits second signals on said cable; and

an autonegotiation controller that communicates with said DSP and that includes a cable detector that determines a first number of pairs of twisted pair wires of said cable that are operable and a speed adjuster that masks an advertised speed of said first device when said cable detector determines that said first number is less than a number of twisted pair wires that are required to support a requested speed of said first device.

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26. (Original) The physical layer of claim 25 wherein said speed adjuster does not mask said advertised speed of said first device when said first number is four.

27. (Original) The physical layer of claim 25 wherein said speed adjuster does not mask said advertised speed of said first device when said requested speed is less than 1 gigabit per second.

28. (Original) The physical layer of claim 25 wherein a pair of twisted pair wires are inoperable when at least one of signals are not received on said pair and signals received by said pair cannot be decoded correctly by said DSP.

29. (Original) The physical layer of claim 25 wherein said cable detector includes a maxwait timer.

30. (Original) The physical layer of claim 29 wherein said cable detector increments a slave counter when said maxwait timer times out and said DSP receives signals on first and second pairs of twisted pair wires but does not receive signals on third and fourth pairs of twisted pair wires

31. (Original) The physical layer of claim 30 wherein said cable detector increments said slave counter when said maxwait timer times out and said DSP receives and decodes signals on said first and second pairs but does not receive signals on said third and fourth pairs of twisted pair wires.

32. (Original) The physical layer of claim 31 wherein said cable detector sets said first number equal to two when said slave counter is equal to slimit.

33. (Original) The physical layer of claim 32 further comprising a status indicator that notifies said first network device when said first speed is being masked.

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34. (Currently Amended) A method for operating a physical layer of a first device that is connected to cable of an Ethernet network, comprising:

coupling a digital signal processor (DSP) to said cable;

receiving and decoding first signals on said cable;

coding and transmitting second signals on said cable;

communicating with said DSP using an autonegotiation controller; and

detecting a first number of pairs of twisted pair wires of said cable that are operable with a cable detector associated with said autonegotiation controller, wherein said autonegotiation controller includes said cable detector.

35. (Original) The method of claim 34 wherein said cable includes at least one of two pairs of twisted pair wires and four pairs of twisted pair wires

36. (Original) The method of claim 34 further comprising masking an advertised speed of said first device using a speed adjuster when said cable detector determines that said first number is less than a number of twisted pair wires required to support a requested speed of said first device.

37. (Original) The method of claim 36 wherein said requested speed is 1 Gigabit per second and said first number is two.

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38. (Original) The method of claim 36 wherein said speed adjuster does not mask said advertised speed of said first device when said first number is four.

39. (Original) The method of claim 36 wherein said speed adjuster does not mask said advertised speed of said first device when said requested speed is less than 1 gigabit per second.

40. (Original) The method of claim 34 further comprising determining that a pair of twisted pair wires are inoperable if signals are not received on said pair.

41. (Original) The method of claim 35 further comprising determining that a pair of twisted pair wires are inoperable if signals received by said pair cannot be decoded correctly by said DSP.

42. (Original) The method of claim 36 further comprising incrementing a first counter using said speed adjuster when said cable detector determines that said first number is equal to two and autonegotiation fails.

43. (Original) The method of claim 42 further comprising setting said first counter equal to zero using said speed adjuster when said first counter is equal to a first limit.

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44. (Original) The method of claim 34 wherein said cable detector includes a maxwait timer and has a first state.

45. (Original) The method of claim 44 further comprising transitioning from said first state to a second state of said cable detector when said DSP receives signals on at least one of a first pair and a second pair of twisted pair wires.

46. (Original) The method of claim 45 further comprising transitioning from said second state to a third state of said cable detector when said DSP receives and decodes signals on said first and second pairs of twisted pair wires.

47. (Previously Presented) The method of claim 46 further comprising transitioning from said second state to a fourth state of said cable detector when said DSP receives signals on at least one of said first and second pairs but not on a third pair and a fourth pair of twisted pair wires and said maxwait timer times out.

48. (Original) The method of claim 47 further comprising transitioning from said third state to said fourth state when said DSP receives and decodes signals on said first and second pairs but does not receive signals on said third and fourth pairs and said maxwait timer times out.

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49. (Original) The method of claim 48 wherein said cable detector includes a slave counter and further comprising incrementing said slave counter each time that said cable detector transitions to said fourth state.

50. (Original) The method of claim 49 further comprising:
returning to said first state when said slave counter is less than slimit; and
setting said first number equal to two when said slave counter equals slimit.

51. (Original) The method of claim 50 further comprising transitioning from said first state to a fifth state of said cable detector when said maxwait timer times out and said DSP fails to detect signals on said first pair and said second pair.

52. (Original) The method of claim 51 wherein said cable detector includes a master counter that is incremented each time that said cable detector transitions to said fifth state.

53. (Original) The method of claim 52 further comprising:
returning to said first state when said master counter is less than mlimit; and
setting said first number equal to two when said master counter equals mlimit.

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54. (Original) The method of claim 53 wherein said cable detector sets said first number equal to four when said DSP receives and decodes signals on said first, second, third and fourth pairs.

55. (Original) The method of claim 54 further comprising transitioning from said second state to a sixth state of said cable detector when said maxwait timer times out and said DSP does not receive and decode signals on said first and second pairs of twisted pair wires.

56. (Original) The method of claim 55 further comprising transitioning from said third state to a sixth state of said cable detector when said maxwait timer times out and said DSP does not receive and decode signals on said first, second, third and fourth pairs.

57. (Original) The method of claim 56 further comprising generating a status indicator that notifies said first network device when said requested speed is being masked.

58. (Original) A physical layer of a first device that is connected to cable of an Ethernet network, comprising:

signal processing means coupled to said cable for receiving and decoding first signals on said cable and for coding and transmitting second signals on said cable; and

autonegotiation means for communicating with said signal processing means and including cable detector means for determining a first number of pairs of twisted pair wires of said cable that are operable.

59. (Original) The physical layer of claim 58 wherein said cable includes at least one of two pairs of twisted pair wires and four pairs of twisted pair wires

60. (Original) The physical layer of claim 58 wherein said autonegotiation means includes speed adjustment means for masking an advertised speed of at least one of said first and second devices when said cable detector means determines that said first number is less than the number of twisted pair wires required for a requested speed of said first device.

61. (Original) The physical layer of claim 60 wherein said requested speed is 1 Gigabit per second and said first number is two.

62. (Original) The physical layer of claim 60 wherein said speed adjustment means does not mask said advertised speed of said first device when said first number is four.

63. (Original) The physical layer of claim 60 wherein said speed adjustment means does not mask said advertised speed of said first device when said requested speed is less than said first speed.

64. (Original) The physical layer of claim 58 wherein a pair of twisted pair wires are inoperable if signals are not received on said pair.

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65. (Original) The physical layer of claim 58 wherein a pair of twisted pair wires are inoperable if signals received by said pair cannot be decoded correctly by said signal processing means.

66. (Original) The physical layer of claim 60 wherein said speed adjuster increments a first counter when said cable detector means determines that said first number is equal to two and autonegotiation fails.

67. (Original) The physical layer of claim 66 wherein said speed adjustment means resets and sets said first counter equal to zero when said first counter is equal to a first limit.

68. (Original) The physical layer of claim 58 wherein said cable detector means includes a maxwait timer and has a first state.

69. (Original) The physical layer of claim 68 wherein said cable detector means transitions from said first state to a second state when said signal processing means receives signals on at least one of a first pair and a second pair of twisted pair wires.

70. (Original) The physical layer of claim 69 wherein said cable detector means transitions from said second state to a third state when said signal processing means receives and decodes signals on said first and second pairs of twisted pair wires.

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71. (Previously Presented) The physical layer of claim 70 wherein said cable detector means transitions from said second state to a fourth state when said signal processing means receives signals on at least one of said first and second pairs but not on a third pair and a fourth pair of twisted pair wires and said maxwait timer times out.

72. (Original) The physical layer of claim 71 wherein said cable detector means transitions from said third state to said fourth state when said signal processing means receives and decodes signals on said first and second pairs but does not receive signals on said third and fourth pairs and said maxwait timer times out.

73. (Original) The physical layer of claim 72 wherein said cable detector means includes a slave counter that is incremented each time said cable detector means transitions to said fourth state.

74. (Original) The physical layer of claim 73 wherein said cable detector means returns to said first state when said slave counter is less than slimit and said cable detector means sets said first number equal to two when said slave counter equals slimit.

75. (Original) The physical layer of claim 74 wherein said cable detector means transitions from said first state to a fifth state when said maxwait timer times out and said signal processing means fails to detect signals on said first pair and said second pair.

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76. (Original) The physical layer of claim 75 wherein said cable detector means includes a master counter that is incremented each time that said cable detector means transitions to said fifth state.

77. (Original) The physical layer of claim 76 wherein said cable detector means returns to said first state when said master counter is less than mlimit and said cable detector means sets said first number equal to two when said master counter equals mlimit.

78. (Original) The physical layer of claim 77 wherein said cable detector means sets said first number equal to four when said signal processing means receives and decodes signals on said first, second, third and fourth pairs.

79. (Original) The physical layer of claim 78 wherein said cable detector means transitions from said second state to a sixth state when said maxwait timer times out and said signal processing means does not receive and decode signals on said first and second pairs of twisted pair wires.

80. (Original) The physical layer of claim 79 wherein said cable detector means transitions from said third state to a sixth state when said maxwait timer times out and said signal processing means does not receive and decode signals on said first, second, third and fourth pairs.

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81. (Original) The physical layer of claim 80 further comprising status indicating means for notifying said first network device when said first speed is being masked.

82. (Original) An Ethernet network, comprising:
a first network device with a first physical layer including a first digital signal processor (DSP) coupled to cable that receives and decodes first signals on said cable and that codes and transmits second signals on said cable, and a first autonegotiation controller that communicates with said first DSP and that includes a first cable detector that determines a first number of pairs of twisted pair wires of said cable that are operable; and

a second network device with a second physical layer including a second DSP coupled to said cable that receives and decodes said second signals on said cable and that codes and transmits said first signals on said cable.

83. (Original) The Ethernet network of claim 82 wherein said second network device includes a second autonegotiation controller that communicates with said second DSP and that includes a second cable detector that determines a first number of pairs of twisted pair wires of said cable that are operable.

84. (Original) The Ethernet network of claim 82 wherein said cable includes at least one of two pairs of twisted pair wires and four pairs of twisted pair wires

85. (Original) The Ethernet network of claim 82 wherein said first autonegotiation controller includes a first speed adjuster that masks an advertised speed of said

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first device when said first cable detector determines that said first number is equal to two and when a first speed is requested by said first device.

86. (Original) The Ethernet network of claim 85 wherein said first speed is 1 Gigabit per second.

87. (Original) The Ethernet network of claim 85 wherein said first speed adjuster does not mask said advertised speed of said first device when said first number is four.

88. (Original) The Ethernet network of claim 85 wherein said first speed adjuster does not mask said advertised speed of said first device when said requested speed is less than said first speed.

89. (Original) The Ethernet network of claim 83 wherein a pair of twisted pair wires are inoperable if signals are not received on said pair.

90. (Original) The Ethernet network of claim 83 wherein a pair of twisted pair wires are inoperable if signals received by said pair cannot be decoded correctly by said first DSP.

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91. (Original) The Ethernet network of claim 85 wherein said first speed adjuster increments a first counter when said first cable detector determines that said first number is equal to two and autonegotiation fails.

92. (Original) The Ethernet network of claim 91 wherein said first speed adjuster resets and sets said first counter equal to zero when said first counter is equal to a first limit.

93. (Original) The Ethernet network of claim 83 wherein said first cable detector includes a maxwait timer and has a first state.

94. (Original) The Ethernet network of claim 93 wherein said first cable detector transitions from said first state to a second state when said first DSP receives signals on at least one of a first pair and a second pair of twisted pair wires.

95. (Original) The Ethernet network of claim 94 wherein said first cable detector transitions from said second state to a third state when said first DSP receives and decodes signals on said first and second pairs of twisted pair wires.

96. (Previously Presented) The Ethernet network of claim 95 wherein said first cable detector transitions from said second state to a fourth state when said first DSP receives signals on at least one of said first and second pairs but not on a third pair and a fourth pair of twisted pair wires and said maxwait timer times out.

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97. (Original) The Ethernet network of claim 96 wherein said first cable detector transitions from said third state to said fourth state when said first DSP receives and decodes signals on said first and second pairs but does not receive signals on said third and fourth pairs and said maxwait timer times out.

98. (Original) The Ethernet network of claim 97 wherein said first cable detector includes a slave counter that is incremented each time said first cable detector transitions to said fourth state.

99. (Original) The Ethernet network of claim 98 wherein said first cable detector returns to said first state when said slave counter is less than slimit and said first cable detector sets said first number equal to two when said slave counter equals slimit.

100. (Original) The Ethernet network of claim 99 wherein said first cable detector transitions from said first state to a fifth state when said maxwait timer times out and said first DSP fails to detect signals on said first pair and said second pair.

101. (Original) The Ethernet network of claim 100 wherein said first cable detector includes a master counter that is incremented each time that said first cable detector transitions to said fifth state.

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102. (Original) The Ethernet network of claim 101 wherein said first cable detector returns to said first state when said master counter is less than mlimit and said cable detector sets said first number equal to two when said master counter equals mlimit.

103. (Original) The Ethernet network of claim 102 wherein said first cable detector sets said first number equal to four when said first DSP receives and decodes signals on said first, second, third and fourth pairs.

104. (Original) The Ethernet network of claim 103 wherein said first cable detector transitions from said second state to a sixth state when said maxwait timer times out and said first DSP does not receive and decode signals on said first and second pairs of twisted pair wires.

105. (Original) The Ethernet network of claim 104 wherein said first cable detector transitions from said third state to a sixth state when said maxwait timer times out and said first DSP does not receive and decode signals on said first, second, third and fourth pairs.

106. (Original) The Ethernet network of claim 105 further comprising a status indicator that notifies said first network device when said first speed is being masked.

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107. (Original) A network device that is connected to cable of an Ethernet network, comprising:

a physical layer including:

a digital signal processor (DSP) coupled to said cable that receives and decodes first signals on said cable and that codes and transmits second signals to said second device on said cable; and

an autonegotiation controller that communicates with said DSP and that includes a cable detector that determines a first number of pairs of twisted pair wires of said cable that are operable.

108. (Original) The network device of claim 107 wherein said first signals are transmitted by a second network device.

109. (Original) The network device of claim 107 wherein said cable includes at least one of two pairs of twisted pair wires and four pairs of twisted pair wires

110. (Original) The network device of claim 107 wherein said autonegotiation controller includes a speed adjuster that masks an advertised speed of said first network device when said cable detector determines that said first number is equal to two and that a first speed is requested by said first network device.

111. (Original) The network device of claim 110 wherein said first speed is 1 Gigabit per second.

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112. (Original) The network device of claim 110 wherein said speed adjuster does not mask said advertised speed of said first network device when said first number is four.

113. (Original) The network device of claim 110 wherein said speed adjuster does not mask said advertised speed of said first network device when said requested speeds are less than said first speed.

114. (Original) The network device of claim 109 wherein a pair of twisted pair wires are inoperable if signals are not received on said pair.

115. (Original) The network device of claim 109 wherein a pair of twisted pair wires are inoperable if signals received by said pair cannot be decoded correctly by said DSP.

116. (Original) The network device of claim 110 wherein said speed adjuster increments a first counter when said cable detector determines that said first number is equal to two and autonegotiation fails.

117. (Original) The network device of claim 116 wherein said speed adjuster resets and sets said first counter equal to zero when said first counter is equal to a first limit.

118. (Original) The network device of claim 117 wherein said cable detector includes a maxwait timer and has a first state.

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119. (Original) The network device of claim 118 wherein said cable detector transitions from said first state to a second state when said DSP receives signals on at least one of a first pair and a second pair of twisted pair wires.

120. (Original) The network device of claim 119 wherein said cable detector transitions from said second state to a third state when said DSP receives and decodes signals on said first and second pairs of twisted pair wires.

121. (Previously Presented) The network device of claim 120 wherein said cable detector transitions from said second state to a fourth state when said DSP receives signals on at least one of said first and second pairs but not on a third pair and a fourth pair of twisted pair wires and said maxwait timer times out.

122. (Original) The network device of claim 121 wherein said cable detector transitions from said third state to said fourth state when said DSP receives and decodes signals on said first and second pairs but does not receive signals on said third and fourth pairs and said maxwait timer times out.

123. (Original) The network device of claim 122 wherein said cable detector includes a slave counter that is incremented each time said cable detector transitions to said fourth state.

124. (Original) The network device of claim 123 wherein said cable detector returns to said first state when said slave counter is less than slimit and said cable detector sets said first number equal to two when said slave counter equals slimit.

125. (Original) The network device of claim 124 wherein said cable detector transitions from said first state to a fifth state when said maxwait timer times out and said DSP fails to detect signals on said first pair and said second pair.

126. (Original) The network device of claim 125 wherein said cable detector includes a master counter that is incremented each time that said cable detector transitions to said fifth state.

127. (Original) The network device of claim 126 wherein said cable detector returns to said first state when said master counter is less than mlimit and said cable detector sets said first number equal to two when said master counter equals mlimit.

128. (Original) The network device of claim 127 wherein said cable detector sets said first number equal to four when said DSP receives and decodes signals on said first, second, third and fourth pairs.

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129. (Original) The network device of claim 128 wherein said cable detector transitions from said second state to a sixth state when said maxwait timer times out and said DSP does not receive and decode signals on said first and second pairs of twisted pair wires.

130. (Original) The network device of claim 129 wherein said cable detector transitions from said third state to a sixth state when said maxwait timer times out and said DSP does not receive and decode signals on said first, second, third and fourth pairs.

131. (Original) The network device of claim 130 further comprising a status indicator that notifies said first network device when said first speed is being masked.

132-155. (Cancelled)

156. (Currently Amended) A method for operating a physical layer of a first device that is connected to cable of an Ethernet network, comprising:

coupling said cable to a digital signal processor (DSP);

receiving and decoding first signals on said cable using said DSP;

coding and transmitting second signals on said cable using said DSP;

determining a first number of pairs of twisted pair wires of said cable that are operable using a cable detector; and

masking an advertised speed of said first device using an autonegotiation controller when said first number is less than a number of twisted pair wires that are required to

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support a requested speed of said first device, wherein said autonegotiation controller includes said cable detector.

157. (Original) The method of claim 156 wherein said advertised speed of said first device is not masked when said first number is four.

158. (Original) The method of claim 156 wherein said advertised speed of said first device is not masked when said requested speed is less than 1 gigabit per second.

159. (Original) The method of claim 156 further comprising determining that a pair of twisted pair wires are inoperable when at least one of signals are not received on said pair and signals received by said pair cannot be decoded correctly by said DSP.

160. (Original) The method of claim 156 further comprising starting a maxwait timer.

161. (Original) The method of claim 160 further comprising incrementing a slave counter when said maxwait timer times out and said DSP receives signals on first and second pairs of twisted pair wires but does not receive signals on third and fourth pairs of twisted pair wires

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162. (Original) The method of claim 161 further comprising incrementing said slave counter when said maxwait timer times out and said DSP receives and decodes signals on said first and second pairs but does not receive signals on said third and fourth pairs of twisted pair wires.

163. (Original) The method of claim 162 further comprising setting said first number equal to two when said slave counter is equal to slimit.

164. (Original) The method of claim 163 further comprising generating a status signal that notifies said first network device when said first speed is being masked.

165. (Currently Amended) A software method for operating a physical layer of a first device that is connected to cable of an Ethernet network, comprising:

coupling said cable to a digital signal processor (DSP);

receiving and decoding first signals on said cable using said DSP;

coding and transmitting second signals on said cable using said DSP;

determining a first number of pairs of twisted pair wires of said cable that are operable using a cable detector; and

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masking an advertised speed of said first device using an autonegotiation controller when said first number is less than a number of twisted pair wires that are required to support a requested speed of said first device, wherein said autonegotiation controller includes said cable detector.

166. (Original) The software method of claim 165 wherein said advertised speed of said first device is not masked when said first number is four.

167. (Original) The software method of claim 165 wherein said advertised speed of said first device is not masked when said requested speed is less than 1 gigabit per second.

168. (Original) The software method of claim 165 further comprising determining that a pair of twisted pair wires are inoperable when at least one of signals are not received on said pair and signals received by said pair cannot be decoded correctly by said DSP.

169. (Original) The software method of claim 165 further comprising starting a maxwait timer.

170. (Original) The software method of claim 169 further comprising incrementing a slave counter when said maxwait timer times out and said DSP receives signals on first and second pairs of twisted pair wires but does not receive signals on third and fourth pairs of twisted pair wires

171. (Original) The software method of claim 170 further comprising incrementing said slave counter when said maxwait timer times out and said DSP receives and decodes signals on said first and second pairs but does not receive signals on said third and fourth pairs of twisted pair wires.

172. (Original) The software method of claim 171 further comprising setting said first number equal to two when said slave counter is equal to slimit.

173. (Original) The software method of claim 172 further comprising generating a status signal that notifies said first network device when said first speed is being masked.

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174. (Original) A physical layer of a first device that is connected to cable of an Ethernet network, comprising:

signal processing means coupled to said cable for receiving and decoding first signals on said cable and for coding and transmitting second signals on said cable; and

autonegotiation control means for communicating with said signal processing means and including cable detection means for determining a first number of pairs of twisted pair wires of said cable that are operable and speed adjusting means for masking an advertised speed of said first device when said cable detection means determines that said first number is less than a number of twisted pair wires that are required to support a requested speed of said first device.

175. (Original) The physical layer of claim 174 wherein said speed adjusting means does not mask said advertised speed of said first device when said first number is four.

176. (Original) The physical layer of claim 174 wherein said speed adjusting means does not mask said advertised speed of said first device when said requested speed is less than 1 gigabit per second.

177. (Original) The physical layer of claim 174 wherein a pair of twisted pair wires are inoperable when at least one of signals are not received on said pair and signals received by said pair cannot be decoded correctly by said signal processing means.

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178. (Original) The physical layer of claim 174 wherein said cable detection means includes a maxwait timer.

179. (Original) The physical layer of claim 178 wherein said cable detection means increments a slave counter when said maxwait timer times out and said signal processing means receives signals on first and second pairs of twisted pair wires but does not receive signals on third and fourth pairs of twisted pair wires

180. (Original) The physical layer of claim 179 wherein said cable detection means increments said slave counter when said maxwait timer times out and said signal processing means receives and decodes signals on said first and second pairs but does not receive signals on said third and fourth pairs of twisted pair wires.

181. (Original) The physical layer of claim 180 wherein said cable detection means sets said first number equal to two when said slave counter is equal to slimit.

182. (Original) The physical layer of claim 181 further comprising status indicating means for notifying said first network device when said first speed is being masked.

Reasons For Allowance

The following is an examiner's statement of reasons for allowance: The applicant's arguments directed towards the autonegotiation controller including the cable detector are persuasive.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DOUGLAS B. BLAIR whose telephone number is (571)272-3893. The examiner can normally be reached on 9:00am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew Caldwell can be reached on (571) 272-3868. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/Douglas B Blair/
Primary Examiner, Art Unit 2442